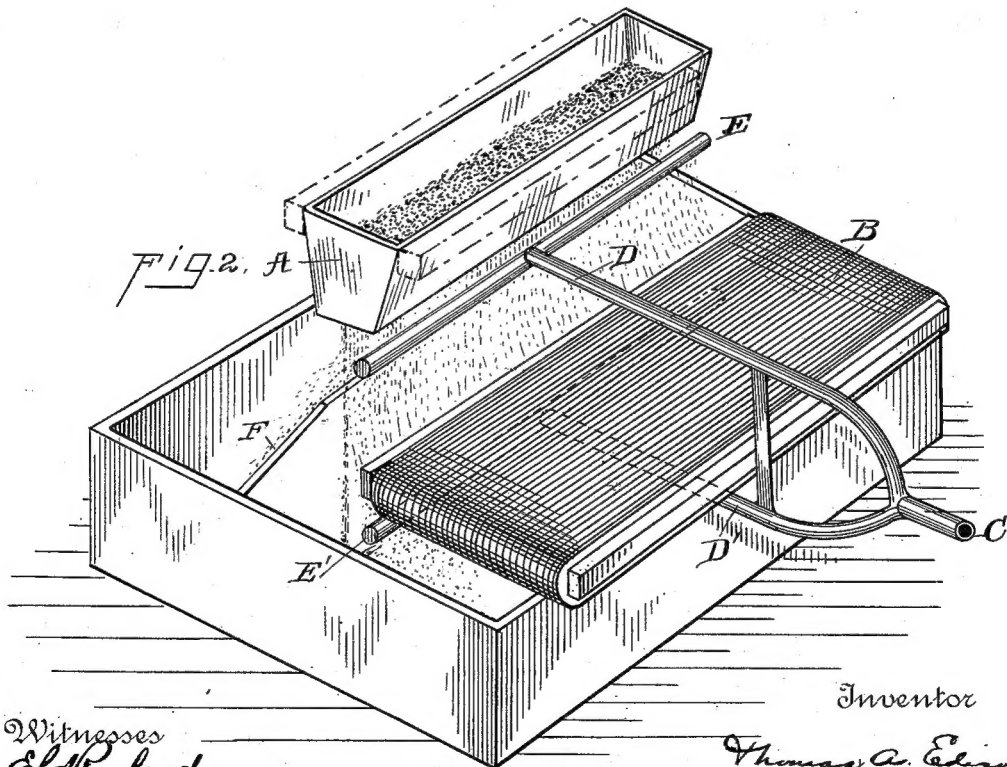
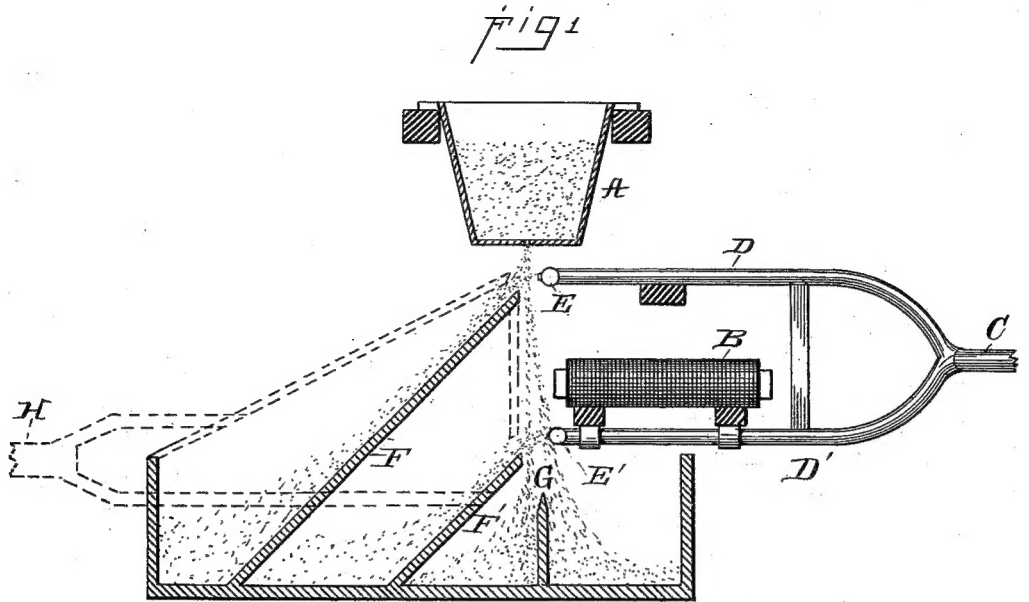


(No Model.)

T. A. EDISON.
MAGNETIC SEPARATOR.

No. 430,275.

Patented June 17, 1890.



Witnesses
Ed. Rowland
William Rye

Inventor
Thomas A. Edison
By *his* Attorneys
John S. ...

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 430,275, dated June 17, 1890.

Application filed September 20, 1888. Serial No. 285,923. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Magnetic Separators, (Case No. 799,) of which the following is a specification.

The object of my invention is to effectively separate magnetic from non-magnetic materials; and my invention consists in certain improvements on the apparatus for this purpose set forth in my patent, No. 228,329, dated June 1, 1880. When the mingled body of magnetic and non-magnetic materials which is to be acted upon by the magnet contains a great many particles of very light substance, as is the case with certain iron ores which contain light particles of phosphorus and silicon ores, it is extremely difficult to effectively separate such light particles from the magnetic material, because they are affected by currents of air, and so may float or be carried into the receptacle for the magnetic particles, whereby the product is rendered impure and unavailable for the Bessemer process. By my present invention I provide means for obviating this difficulty. I employ for this purpose a gentle current of air affecting the stream of materials as it falls from the hopper, whereby the extremely light particles are separated from the rest and directed into a separate receptacle which is provided for them.

Another feature of my invention consists in the employment of an open-end magnet or a bar-magnet, in connection with means for directing an air-current against the falling material, as will be described. I find that this is exceedingly advantageous in the process of separation, because where a horseshoe-magnet is used its magnetic field is small and concentrated, and does not include a large quantity of the material, whereas with the bar-magnet the magnetic field is very much spread out and acts upon the falling stream throughout a large part of its extent, and the impressed magnetism on the magnetic ore, while sufficient to alter its trajectory, is at no time during its fall of sufficient strength to cause such particles to mutually attract each other, and thus lock the non-magnetic particles between the magnetic particles, which

would make the product too rich in phosphorus or other foreign materials for the Bessemer process.

My invention is illustrated in the accompanying drawings.

Figure 1 is a vertical section of and partial side elevation of the magnetic separator embodying my invention, and Fig. 2 is a perspective view of the same.

I employ a hopper A, of the kind set forth in my application filed March 29, 1888, Serial No. 268,749—that is, one having a flat bottom containing a long narrow aperture or a long row of small holes through which the material falls in a wide thin stream. A short distance below the hopper is placed the magnet B, which is a wide flat bar-magnet whose pole extends the whole width of the stream which falls from the hopper.

C is a pipe which extends from a suitable fan or blower adapted to produce a gentle current of air. This pipe is divided into two branch pipes D and D'. Pipe D extends beneath the hopper a short distance below it and terminates in a long cross-pipe E, which extends the whole width of the hopper, and is provided with an aperture or series of apertures through which the current of air is directed against the falling particles. The pipe D' extends below the magnet B and terminates in a cross-pipe E', whereby the air-current is also directed against the falling particles at this point. On the other side of the opening in the hopper and just below the pipes D and D', I provide inclined partitions F and F'. It will be seen that as the stream of mingled magnetic and non-magnetic particles falls from the hopper the air-current from the pipe E will separate from it the very light non-magnetic particles, and these will pass to the left of the partition F and fall into the receptacle formed by said partition. Any light particles which are not removed at this point will receive the air-current from the pipe E' and be blown past the partition F'. The magnet B, as will be well understood, alters the direction of falling of the magnetic portion of the material, so that it falls to the right of the partition G, while the non-magnetic particles, which are too heavy to be affected by the air-current, will fall vertically from the hopper into the space between par-

titions F' and G. The widely-diffused magnetic field of the bar-magnet acts upon the material more effectively than the concentrated field of a horseshoe-magnet, as already explained.

The dotted lines in Fig. 1 illustrate a modification of my invention. An air-tight chamber is provided with an opening in proximity to the falling stream, and a pipe H leads from this chamber to an exhausting apparatus. Air being constantly withdrawn from the chamber, the air-current produced by the suction acts upon the light particles and draws them into the chamber. The chamber between partitions F' and G may also be made air-tight and provided with an exhaust-pipe with a similar result.

What I claim is—

1. In a magnetic separator, the combination, with the hopper and the magnet for altering the trajectory of the magnetic material, of means for producing an air-current acting upon the falling material, substantially as set forth.

2. In a magnetic separator, the combination, with the hopper and the magnet for altering the trajectory of the magnetic material, of means for directing an air-current against the falling material, substantially as set forth.

3. In a magnetic separator, the combination, with the hopper and the magnet for altering the trajectory of the magnetic material, of the inclined partition and the air-pipe for directing a current of air against the falling material, substantially as set forth.

4. In a magnetic separator, the combination of the hopper having an opening through which the material falls in a wide thin stream, the magnet below the same for altering the trajectory of the magnetic material, and the air-pipe placed parallel with the falling stream, whereby the air-current is directed against the full width of the stream, substantially as set forth.

5. In a magnetic separator, the combination, with a hopper and a bar-magnet for altering the trajectory of the magnetic material, of means for directing an air-current against the falling material, substantially as set forth.

This specification signed and witnessed this 12th day of September, 1888.

THOS. A. EDISON.

Witnesses:

WILLIAM PELZER,
A. W. KIDDLE.